EXHIBIT E

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

GESTURE TECHNOLOGY PARTNERS, LLC, 　　　　　Plaintiff v. HUAWEI DEVICE CO., LTD., HUAWEI DEVICE USA, INC., 　　　　　Defendants.	**JURY TRIAL DEMANDED** C.A. NO. 2:21-cv-00040-JRG LEAD CONSOLIDATED CASE
SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG ELECTRONICS AMERICA, INC., 　　　　　Defendants.	C.A. NO. 2:21-cv-00041-JRG

**EXPERT DECLARATION OF BENEDICT OCCHIOGROSSO IN SUPPORT OF
PLAINTIFF'S OPENING CLAIM CONSTRUCTION BRIEF**

I, Benedict Occhiogrosso, do hereby make the following declaration:

I.   INTRODUCTION

1.   I have been retained by Williams, Simons, & Landis, PLLC (hereinafter "WSL"), to provide various opinions regarding U.S. Patent Nos. 7,933,431 (the "'431 Patent"); 8,194,924 (the "'924 Patent"); 8,878,949 (the "'949 Patent"); and 8,553,079 (the "'079 Patent") (the "Asserted Patents"). I understand that my declaration is being submitted in connection with Plaintiff Gesture Technology Partners LLC's ("Plaintiff" or "GTP") Opening Claim Construction Brief. Unless otherwise noted, the statements made herein are based on my personal knowledge and, if called to testify with regards to this declaration, I could and would do so competently and truthfully.

2.   My analysis and basis for my opinions are set forth below. I reserve the right to supplement or amend my analysis, conclusions, and any opinions I make this declaration in response to claim construction positions and opinions expressed by Defendants Huawei Device Co., Ltd., Huawei Device USA, Inc., and Samsung Electronics Co., Ltd., and Samsung Electronics America, Inc.'s (collectively, "Defendants") witnesses, or in light of any additional evidence, testimony, discovery, or other information that may be provided to me after the date of this declaration.

3.   I make this declaration pursuant to Local Patent Rule 4-3(b). But I note that Defendants have not provided sufficient notice of the reasoning behind their proposed constructions, including why certain claim terms are allegedly indefinite or lack antecedent basis. Therefore, I reserve my right to supplement my opinions in response to Defendants' positions when they are provided.

4.   I have been retained in this matter by WSL as a technical expert in the field of electrical communications engineering and human-computer interaction. I am being compensated

for my work in this matter at my usual and customary rate. I am also being reimbursed for all reasonable expenses that I incur during the course of this work. My compensation does not depend upon the results of my analysis or the substance of my testimony. Nor does my compensation depend on the outcome of this litigation or any related proceeding, and it is not based on the result of any issue in this litigation. I have no personal interest in the outcome of this litigation.

II.   BACKGROUND AND QUALIFICATIONS

5.   Provided below is a summary of my educational background, career history, and publications. My curriculum vitae is attached as Exhibit A to this declaration.

6.   I hold a Bachelor of Science Degree in Electrical Engineering as well as a Master of Science Degree in Electrical Engineering, both from the Polytechnic Institute of Brooklyn (now part of New York University).

7.   I have authored or co-authored nearly three dozen articles in peer-reviewed journals, conference proceedings, texts, industry trade publications, and monographs. These publications span a range of topics including Integrated Voice–Data Communications/Switching, Integrated Packet-Circuit Switching, Voice Digitization, Packet Voice, Indoor Wireless distribution, Disaster Recovery and Business Continuity, Data Center Engineering, Switching Processor Architecture, Telephone and Voice Mail Systems, PBX & LAN switching premises-based systems and related technologies and Internet of Things (IoT).

8.   I have more than 40 years of telecommunications and information technology experience. I am the co-founder and President of DVI Communications Inc., a telecommunications and information technology and business consulting firm. Since the establishment of DVI in 1979, I have planned, designed, implemented, and managed large-scale projects involving wired and wireless communications systems, which included transmission of voice and data. Prior to founding DVI and for several years thereafter, I held a Department of Defense security clearance

and worked on several classified programs within the defense industry, where I supported the development of several pioneering technologies that have served as the prototypes for many telecommunications and IT systems later utilized in commercial practice.

9.   I have extensive expertise in voice-data-video switching, and transmission systems deployed in networks, including both circuit switching and packet switching using wireline and wireless distribution methods (including Land Mobile radio, Satellite, microwave, cellular and Wi-Fi). In addition, I have developed various applications systems including voicemail, e-mail, unified messaging, and audio/video recording for a variety of facility types including call-contact centers, data centers, trading floors, and mission-critical communications centers. At present, my primary responsibilities encompass strategic planning and systems design of client IT Infrastructures and program management for major projects undertaken by DVI.

10.   With respect to wireless communications, I am knowledgeable in transceiver architecture and design (including RF and baseband systems), operating over various channels subject to different types of performance degradation (including noise, multipath , rainfall, etc.). I have designed and deployed numerous wireless communications systems over the course of my career operating at UHF, microwave and millimeter wave frequencies supporting several applications including voice / data/ video telecommunications, Automatic Vehicle Location(AVL) , SCADA and telemetry in both outdoor and indoor settings. I am knowledgeable in modulation techniques, error correction /error detection coding and related signal processing used in transmission and reception supporting Land Mobile Radio, Cellular (from AMPS through 5G) and Wi-Fi (different vintages) . as well as satellite and microwave. Among the clients I have supported over the years included DARPA Packet Radio network (PRNET) technology for survivable networks, Xerox's pioneering XTEN Network (Microwave bypass (10.5 GHz) used

as an alternative to Telco local loops), United Nations (multi-location C-band earth stations in a voice – data – fax network), TVRO applications for Bertelsmann BMG, Citicorp's Ku- band CitiSATCOM network for data and video distribution, a major Financial Exchange's low latency network for high frequency trading using cascaded microwave links, and NYC Transit's 700/800 MHZ regional Bus radio System comprising 36 base stations supporting a fleet of 6000 + revenue producing vehicles for CAD/AVL, Fleet management   and Dispatch- to-   Operator communications.. I have served as both a consulting and/or testifying expert in several cases enumerated in my CV. I have extensive experience in cellular voice/ data communications technology and have supported multiple sides of the industry including Service Providers such as Sprint/Nextel Wireless, AT&T Wireless, Vonage, Rebtel.; Equipment Manufacturers including Kyocera, Apple, Ademco, Nokia, M/A-com, Partech and Licensing. entities such as ASCAP (in their critical review of cellular technology).

11.　　With respect to video, I have supported several clients in video distribution – (for broadcast industry clients - BMG, Gannett, WNET 13), video surveillance (for clients -NYC SCA, MTA PD, NYC DoT), and video compression / encoding in the context of Audio – Video Distribution and Video conferencing (for clients war rooms/ board rooms :Nassau Count Govt. operations, MTA, NFL , AIG)\. I am very familiar with the underlying technology of these systems including camera technology, video recording, digital video compression / signal processing (codecs supporting various algorithms), selected   image processing and video analytics applications as well as the full gamut of network distribution methods (ranging from traditional matrix switching to video over IP).

III.　　RELEVANT LEGAL PRINCIPLES

12.　　I understand the parties have proposed a number of claim terms and phrases for construction by the Court, and that the parties have offered competing proposed constructions for

these claim terms and phrases. In the sections that follow, I offer my opinions as a person of ordinary skill in the art on the construction of certain of these claim terms and phrases.

13.   For the purposes of this report, I have been informed about certain aspects of the law that are relevant to my analysis and opinions. I have applied these legal principles in rendering my opinions below.

A.   Ordinary and Customary Meaning of a Claim Term

14.   I understand that the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention. I understand the time of the invention to be sometime between 1998 at the earliest and 1999. I understand that in the absence of an express intent on the part of the inventor to give a special meaning to the claim terms, the words are presumed to take on the ordinary and customary meanings attributed to them by a person of ordinary skill in the art.

15.   I understand that the basis for a term's ordinary and customary meaning may be derived from a variety of sources, including the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art at the time of the invention.

16.   I have been instructed that dictionary definitions or definitions from technical references can be used to inform or confirm the ordinary and customary meaning of words found in a claim, but that in construing claim terms, the general meanings gleaned from reference sources, such as dictionaries, must always be compared against the use of the terms in the context of the claim itself.

17.   I understand that a patent applicant is entitled to be his or her own lexicographer (in other words, provide his or her own meaning to a word or phrase) and may rebut the

presumption that claim terms are to be given their plain and ordinary meaning. To do so, the applicant must clearly set forth a definition of the term that is different from its ordinary and customary meaning. Where the applicant provides an explicit definition for a term, that definition will control interpretation of the term as it is used in the claim in which it appears. I understand that the specification can also be relied on for more than just explicit lexicography to determine the meaning of a claim term. For example, I understand that the meaning of a particular claim term may also be determined by implication, that is, according to the usage of the term in the context of the specification.

B.   35 U.S.C. Section 112, Paragraph 6

18.   I have been informed that a patent claim may be expressed using functional language. I have further been informed that Section 112, Paragraph 6, provides that a structure may be claimed as a "means . . . for performing a specified function." There is a rebuttable presumption that Section 112, Paragraph 6 applies when the claim language includes "means" or "step for" terms, and that it does not apply in the absence of those terms. The presumption stands or falls according to whether one of ordinary skill in the art would understand the claim with the functional language—when read in the context of the specification and figures—to denote sufficiently definite structure for performing the function. However, I also have been informed that when reading and understanding claim language, one should not import limitations from the specification into the claim language.

19.   I have also been informed that construing a claim limitation under Section 112, Paragraph 6 is a multi-step process. After it has been determined whether or not Section 112, Paragraph 6 applies, first, a determination is made as to what the function of the claim term is, and second a determination as to what structure in the specification performs that function, and what any equivalents of that structure may be.

C.   Level of Skill in the Art

1.   The '431 Patent and the '924 Patent

20.   I was asked to provide my opinion about the experience and background a person of ordinary skill in the art ("POSITA") of the '431 Patent and the '924 Patent would have had as of July 8, 1999.

21.   With respect to the '431 Patent and the '924 Patent, a POSITA in the art related to the technology of the '431 Patent and the '924 Patent as of July 8, 1999 would have had a bachelor's degree in Electrical Engineering, Computer Engineering, or an equivalent field, and at least two years of experience working in the field of human-computer interaction. This POSITA would have had knowledge of design considerations known in the industry, would have been familiar with then-existing products and solutions, and would have understood how to search available literature for relevant publications. Additional experience in the industry or academia may have taken the place of education and vice-versa.

22.   I believe that based on my experiences outlined above, I can opine today about what those of skill in the art would have known and understood as of July 8, 1999.

2.   The '949 Patent

23.   I was asked to provide my opinion about the experience and background a person of ordinary skill in the art ("POSITA") of the '949 Patent would have had as of May 11, 1999.

24.   With respect to the '924 Patent, a POSITA in the art related to the technology of the '924 Patent as of May 11, 1999would have had a bachelor's degree in Electrical Engineering, Computer Engineering, or an equivalent field, and at least two years of experience working in the field of human-computer interaction. This POSITA would have had knowledge of design considerations known in the industry, would have been familiar with then-existing products and

solutions, and would have understood how to search available literature for relevant publications. Additional experience in the industry or academia may have taken the place of education and vice-versa.

25.   I believe that based on my experiences outlined above, I can opine today about what those of skill in the art would have known and understood as of May 11, 1999.

3.   The '079 Patent

26.   I was asked to provide my opinion about the experience and background a person of ordinary skill in the art ("POSITA") of the '079 Patent would have had as of November 9, 1998.

27.   With respect to the '079 Patent, a POSITA in the art related to the technology of the '079 Patent as of November 9, 1998 would have had a bachelor's degree in Electrical Engineering, Computer Engineering, or an equivalent field, and at least two years of experience working in the field of human-computer interaction. This POSITA would have had knowledge of design considerations known in the industry, would have been familiar with then-existing products and solutions, and would have understood how to search available literature for relevant publications. Additional experience in the industry or academia may have taken the place of education and vice-versa.

28.   I believe that based on my experiences outlined above, I can opine today about what those of skill in the art would have known and understood as of November 9, 1998.

IV. OVERVIEW OF THE ASSERTED PATENTS

A. U.S. Patent Nos. 7,933,431 and 8,194,924

1. The '431 Patent

29.   U.S. Patent No. 7,933,431 (the "'431 Patent") is entitled "Camera Based Sensing In Handheld, Mobile, Gaming, Or Other Devices." I have been informed by counsel that this patent has a priority date of July 8, 1999.

30.   The '431 Patent is directed towards methods and apparatuses "to enable rapid TV camera and computer-based sensing in many practical applications, including, but not limited to, handheld devices, cars, and video games." '431 Patent, Abstract. The claims of the '431 Patent relate in general to "input devices for computers, particularly, but not necessarily, intended for use with 3-D graphically intensive activities, and operating by optically sensing a human input to a display screen or other object and/or the sensing of human positions or orientations." '431 Patent, 2:7-11.

31.   The '431 Patent describes the use of computer devices and one or more cameras that "optically sens[e] human input" with applications in a "variety of fields such as computing, gaming, medicine, and education." '431 Patent, 2:7– 17. In general, the '431 Patent discloses numerous applications in which a user or an object held by a user control a computer with one or more cameras as depicted in Fig. 1A below:
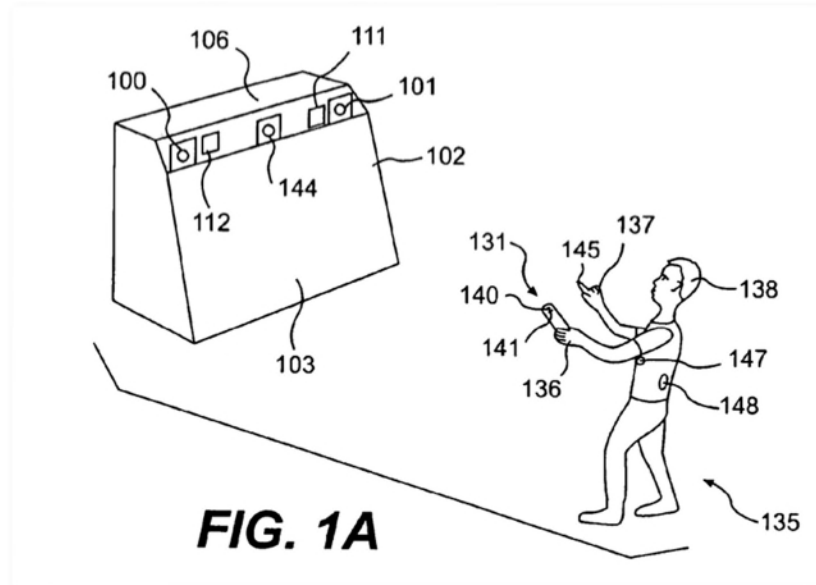
FIG. 1A

'431 Patent, Fig. 1A. In this embodiment, there are multiple cameras (100, 101, 144) located on

around a monitor (102) with a screen facing a user (103) and connected to a computer (106).

'431 Patent, 3:23-52.

32.   The '431 Patent also discloses a handheld device, such as a cell phone, that

processes imaging from a person or object to control functions on the handheld device. '431

Patent, 11:62:-67. The '431 Patent describes that the handheld device can "perform a control

function by determining [] position, orientation, pointing direction or other variable with respect

to one or more external objects, using an optical sensing apparatus . . . or with a camera located in

the handheld device, to sense datums or other information external for example to the device."

'431 Patent, 12:1-9. The '431 Patent describes that the device is able to "acquire features of an

object and use it to determine something" such as object recognition. '431 Patent, 13:5-21.

2.   The '924 Patent

33.   U.S. Patent No. 8,194,924 (the "'924 Patent") is entitled "Camera Based Sensing

in Handheld, Mobile, Gaming, or Other Devices." I have been informed by counsel that this patent

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has a priority date of July 8, 1999. I have also been told by counsel that the '924 Patent is a continuation of '431 Patent. The patents share substantially the same specification.

B.   U.S. Patent No. 8,878,949

34.   U.S. Patent No. 8,878,949 (the "'949 Patent") is entitled "Camera Based Interaction and Instructions." I have been informed by counsel that this patent has a priority date of May 11, 1999.

35.   The '949 Patent is generally directed to using gestures in conjunction with digital imaging. '949 Patent, Abstract. The '949 Patent describes methods and apparatuses "to enhance the quality and usefulness of picture taking for pleasure, commercial, or other business purposes." '949 Patent, 1:4-6. The claims of the '949 Patent relate in general to "detect[ing] a gesture" and performing functions in response to the detected gestures. '949 Patent, Claims 1, 8, 13.

36.   The'949 Patent describes improving the process of capturing images by analyzing a field of view and capturing an image when objects or gestures are detected. '949 Patent, 1:50-2:8. Fig. 1 of the '949 Patent illustrates a user engaging the invention to have their picture taken:
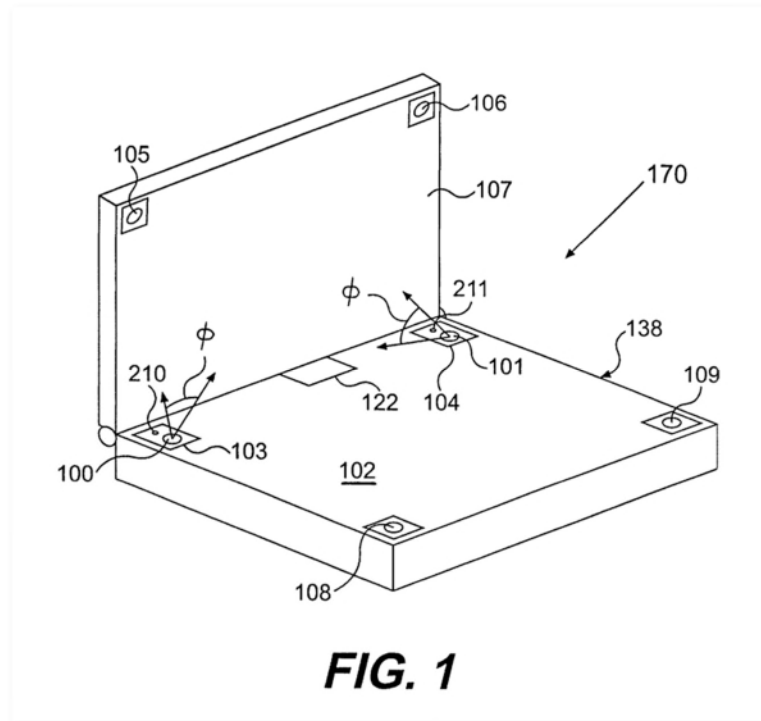

FIG. 1

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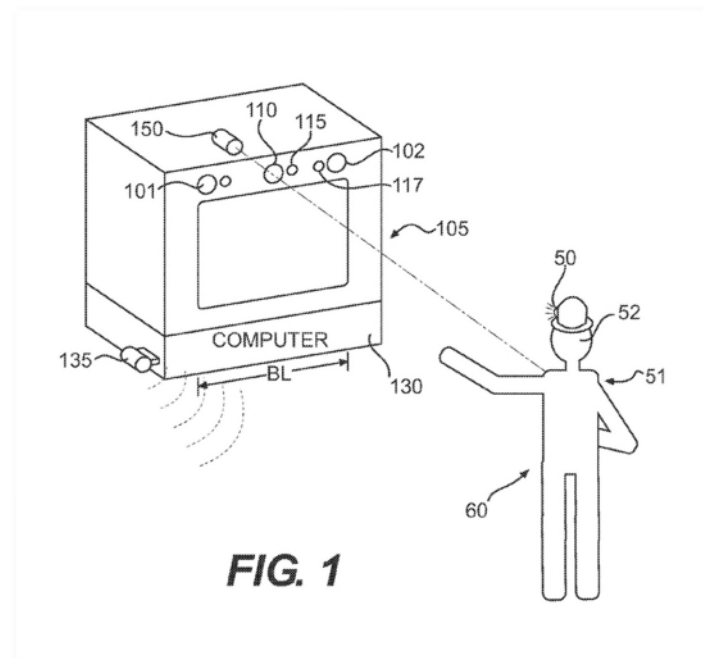
The '949 Patent, Fig. 1. In Fig. 1, a pair of cameras (101 and 102) detect data on a point of the user (51). The '949 Patent, 3:10-38. The '949 Patent describes numerous scenarios that cause an image to be captured when detected: (1) when a "[s]ubject in a certain pose," (2) a "[s]ubject in a sequence of poses," (3) a "[p]ortion of [s]ubject in a sequence of poses (e.g., gestures)," (4) a "[s]ubject or portion(s) in a specific location or orientation," (5) a "[s]ubject in position relative to another object or person" such as a "bride and groom kissing in a wedding," and (6) "a subject undertak[ing] a particular signal comprising a position or gesture" such as "raising one's right hand." '949 Patent, 5:30-49.

C.   U.S. Patent No. 8,553,079

37.   U.S. Patent No. 8,553,079 (the "'079 Patent") is entitled "More Useful Man Machine Interfaces and Applications." I have been informed by counsel that this patent has a priority date of November 9, 1998.

38.   The '079 Patent is directed towards a method for "determining a gesture illuminated by a light source utilizes the light source to provide illumination through a work volume above the light source." '079 Patent, Abstract. The '079 Patent generally describes computer input devices in combination with at least one camera and a light source to observe points on the human body and optically sense human positions and/or orientations. '079 Patent, Abstract; 1:54-2:6. Fig. 1 below illustrates one exemplary embodiment implemented in a laptop computer:

FIG. 1

'079 Patent, Fig.1. Fig. 1 illustrates a laptop with two cameras (100 and 101) pointed towards a work volume (170) to "determine the pointing direction vector 160 of the user's finger (for example pointing at an object displayed on screen 107), or the position and orientation of an object held by the user." '079 Patent, 2:39-58. Alternatively, the embodiment may "determine gestures such as pinch or grip, and other examples of relative juxtaposition of objects with respect to each other[.]" '079 Patent, 2:58-60.

V.   OPINIONS REGARDING CLAIM CONSTRUCTION

39.   I understand the parties have proposed a number of claim terms and phrases for construction by the Court, and that the parties have offered competing proposed constructions for these claim terms and phrases. In the sections that follow, I offer my opinions as a person of ordinary skill in the art on the construction of certain of these claim terms and phrases.

A.   '431 Patent Claim Terms

40.   I have been asked by counsel to provide opinions regarding the following disputed claim terms of the '431 Patent.

1.   "sensing means associated with said device"

41.   I understand that the parties have proposed the following constructions for the term "sensing means associated with said device."

GTP: No construction necessary. Alternatively, if the Court finds this term is subject to 35 U.S.C. § 112 ¶ 6: Structure: "Electro-optical sensor." Function: "electro-optically sensing light reflected from at least one finger."

Samsung/Huawei: Function: "electro-optically sensing light reflected from said at least one finger." Structure: "a camera."

42.   I have been asked to opine whether the term "sensing means associated with said device" recites sufficient structure to a POSITA for performing the recited function. The recited function is "electro-optically sensing light reflected from said at least one finger." The recited function comes from the remainder of the claim limitation: "electro-optically sensing light reflected from said at least one finger using a sensing means associated with said device." In my opinion, this term recites sufficient structure to a POSITA for performing the recited function.

43.   Specifically, a POSITA would understand that a "sensing means" is simply a sensor, which is a device that senses a stimuli. In this instance, the claim recites sufficient structure for performing the recited function because it simply requires a sensor, or sensing means, that can electro-optically sense light reflected from a finger. I base my opinions on my expertise and understanding of the knowledge of a POSITA at the time of the invention, the claim language itself and the teachings of the specification. Thus, in my opinion the claim language including the use

of the word "sensing" before the word means coupled with the functional language of the claim provides sufficiently definite structure for one of skill in the art to understand what is being claimed and the structure required to perform the recited function. My opinions and understanding are also supported by the teachings of the specification that provide examples of sensors for "electro-optically sensing light." Such examples can be found at Abstract, 3:15-19; 3:44-52, 4:42-47, 8:14-24, 9:16-28, 11:54-58, 14:30-32, 14:52-59; 15:3-17, 17:4-16, 18:6-8, 18:20-24, 19:3-8, 20:23-25, 20:45-49, 21:21-26, 22:9-12, 23-58-65, 25:22-35, FIGS. 1A, 1B, 1C, 2A, 5, 10, 11A, 11B, 13, 17A, 17B, all of which I used in forming my opinions.

44.   I have also been asked to opine on the corresponding structure for this term if the Court determines that it should be construed according to pre-AIA 35 U.S.C. § 112, ¶6. I understand that the recited function for this term is "electro-optically sensing light reflected from said at least one finger."

45.   I understand that the corresponding structure for performing the recited function is structure disclosed in the intrinsic record that is clearly linked or associated with the recited function. The corresponding structure should not include structure that is unnecessary to perform the recited function.

46.   It is my opinion that an "electro-optical sensor" is the structure disclosed and clearly linked in the specification for performing the recited function. For example, the specification states that "the TV camera of the invention can be used to see either natural or artificial features of objects," including fingers. '431 Patent at 10:64-11:6. Similarly, the specification describes one or more "TV cameras (**or other suitable electro-optical sensors**)" used to for sensing objects, such as fingers. *See id.* at 11:54-61. This is consistent with the description of the invention, which

notes that it pertains to "TV cameras (**or other suitable electro-optical sensors**). . . ." *See id.* at 3:15-22.

47.   I understand that Defendants contend that the corresponding structure for performing the recited function is a "camera." I disagree because the specification specifically states that the recited function can be performed with a TV camera or "other suitable electro-optical sensors." Moreover, the recited function recites "electro-optically sensing." Sensors other than cameras can perform electro-optical sensing. Thus, any structure in my opinion must include at least the group of sensors that are electro-optical sensors, as the specification states repeatedly.

> **2.   "computer means within said housing for analyzing said image to determine information concerning a position or movement of said object"**

GTP: No construction necessary. Alternatively, if the Court finds this term is subject to 35 U.S.C. § 112 ¶ 6: Structure: A computer. Function: "analyzing said image to determine information concerning a position or movement of an object"

Samsung/Huawei: Means-plus-function Function: "analyzing said image to determine information concerning a position or movement of said object [positioned by a user operating said object]" The dependent claims currently asserted by Plaintiff further add to the function, including: (1) wherein said object is a finger (Claim 8) Structure: "A computer programmed to (1) scan the pixel elements in a matrix array on which said image is formed, and then calculate the centroid location "x,y" of a target on the object using the moment method disclosed in U.S. Patent No. 4,219,847 to Pinkney, as disclosed at 4:48-62; (2) add or subtract said image from prior images and identify movement blur, as disclosed at 6:64-7:14, 7:22-29; (3) obtain a time variant intensity change in said image from the detected output voltage from the signal conditioning of the camera means or by subtracting images and observing the difference due to

such variation, as disclosed at 8:25-38; or (4) detect a change in color reflected from a diffractive, refractive, or interference based element on said object that reflects different colors during movement, as disclosed at 8:60-9:14."

48.   I have been asked to opine whether the term "computer means within said housing for analyzing said image to determine information concerning a position or movement of said object" recites sufficient structure to a POSITA for performing the recited function. The recited function is "analyzing said image to determine information concerning a position or movement of said object." In my opinion, this term recites sufficient structure to a POSITA for performing the recited function. A POSITA would understand the term "computer means" to be a computer. A "computer" is a well-known term and denotes specific structure to a POSITA. I base my opinions on my expertise and understanding of the knowledge of a POSITA at the time of the invention, the claim language itself and the teachings of the specification. Moreover, the surrounding claim language recites functionality that a POSITA would associate with a computer, namely analyzing and determining. Thus, in my opinion the claim language including the use of the word "computer" before the word means coupled with the functional language of the claim provides sufficiently definite structure for one of skill in the art to understand what is being claimed and the structure required to perform the recited function. My opinions and understanding are also supported by the teachings of the specification that provide examples analyses and determination being performed by a computer. Such examples can be found at Abstract, 2:7-13, 2:20-23, 3:15-33, 4:56-62, 6:1-19, 6:27-32, 7: 22-29, 7:55-76, 12:42-64, 13:8-15, 14:45-51, 16:1-17, 17:34-50, 19:16-34, 23:66-24:7, 24:35-50, FIGS. 1A.

49.   I have also been asked to opine on the corresponding structure for this term if the Court determines that it should be construed according to pre-AIA 35 U.S.C. § 112, ¶6. I

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understand that the recited function for this term is analyzing said image to determine information concerning a position or movement of said object."

50.   It is my opinion that "a computer" is the structure disclosed and clearly linked in the specification for performing the recited function. For example, the specification describes "a combination of one or more TV cameras (or other suitable electro-optical sensors) and a computer to provide various position and orientation related functions of use." '431 Patent at 11:55-58. In another example, a computer is describes as analyzing images to determine the position and/or orientation of a cell phone. *Id.* at 12:42-56.

51.   I understand that a computer can be sufficient structure for functions that can be performed by a general purpose computer. Here, the recited functions are analyzing and determining, which are functions that can be performed by a general purpose computer. That is why it is my opinion that a computer is sufficient structure for performing the recited function.

52.   I understand that Defendants contend that the corresponding structure is "A computer programmed to (1) scan the pixel elements in a matrix array on which said image is formed, and then calculate the centroid location 'x,y' of a target on the object using the moment method disclosed in U.S. Patent No. 4,219,847 to Pinkney, as disclosed at 4:48-62; (2) add or subtract said image from prior images and identify movement blur, as disclosed at 6:64-7:14, 7:22-29; (3) obtain a time variant intensity change in said image from the detected output voltage from the signal conditioning of the camera means or by subtracting images and observing differences due to such variation, as disclosed at 8:25-38; or (4) detect a change in color reflected from a diffractive, refractive, or interference based element on said object that reflects different colors during movement, as disclosed at 8:60-9:14." I disagree. Defendants' corresponding structure contains structure that does not correspond to the recited function. For example, scanning the pixel

elements in a matrix array on which the image is formed pertains to capturing the image. In another example, obtaining intensity signals based on output voltage from the signal conditioning means of a camera pertains to image capture, not analyzing the image. Additionally, it is my understanding that the corresponding structure should be that which is necessary to perform the recited function. Here the recited function is "analyzing said image to determine information concerning a position or movement of said object." Some of the cited functionality by Defendants is not "necessary" to perform the recited function of analyzing said image to determine information. Rather, the additional limitations imposed by Defendants' proposal address the types of data that may be analyzed but not the structure for analyzing that data. That structure is a computer.

3. "means for controlling a function of said apparatus using said information"

GTP: Structure: "a control system associated with a camera." Function: "controlling a function of said apparatus using said information."

Samsung/Huawei: Means-plus-function Function: "controlling a function of said [handheld computer] apparatus using said information [concerning a position or movement of said object positioned by a user operating said object]" The dependent claims currently asserted by Plaintiff further add to the function, including: (1) wherein said object is a finger (Claim 8) Structure: Indefinite.

53.   I understand that the parties agree that this term should be construed according to pre-AIA 35 U.S.C. § 112, ¶6. I understand that the recited function for this term is "controlling a function of said apparatus using said information."

54.   It is my opinion that "a control system associated with a camera" is the structure disclosed and clearly linked in the specification for performing the recited function. The

specification describes the invention in terms of camera capabilities and their effect on the ability

to control different devices through a control system. *See* '431 Patent at 5:50-60. Specifically,

the '431 Patent states that "[t]his has major ramifications for the robustness of control systems

built on such camera based acquisition, be they for controlling displays, or machines or whatever."

See id. at 5:57-60. The control system described in the specification is associated with a camera,

and is used to control "displays, or machines or whatever." *Id.* This mirrors the language of claim

7 and the recited function: The camera means and means for controlling are in the same handheld

computer apparatus, so the control system is associated with the camera. And the control system

is used for controlling a function of that apparatus.

55.   I understand that Defendants contend that this term is indefinite because the

specification does not disclose any corresponding structure. I disagree because, as I opined above,

"a control system associated with a camera" is the structure disclosed and clearly linked in the

specification for performing the recited function. It is also my understanding that Defendants and

their expert have not set forth their reasoning for why they believe this term is indefinite. I reserve

my right to amend my opinions based on the opinions rendered by Defendants' expert for this

term.

4.   "means for transmitting information"

GTP: Structure: A transmitter. Function: "transmitting information"

Samsung/Huawei: Function: "transmitting information" Structure: "cellular transceiver"

56.   I understand that the parties agree that this term should be construed according to

pre-AIA 35 U.S.C. § 112, ¶6. I understand that the recited function for this term is "transmitting

information."

57.   It is my opinion that "a transmitter" is the structure disclosed and clearly linked to the specification for performing the recited function. The specification describes the claimed handheld computer apparatus being implemented in, for example, a cell phone. '431 Patent at 11:62-64 (describing Fig. 8A). And the specification also describes using "the cell phones own connection" to transmit information. *See id.* at 12:65-13:7. But the specification does not limit the transmission of information to the cell phone's cellular transceiver. A POSITA would understand that at the time of the invention, cellular phones and similar handheld devices included different types of transmitters, such as Bluetooth and Wi-Fi. The specification clearly links "the cell phones own connection" to performing the recited function, so the corresponding structure is a transmitter, not a specific type of transmitter or transceiver.

58.   It is also my opinion that requiring a transceiver includes structure not necessary to perform the recited function. The recited function is "transmitting information." A transceiver is capable of both transmitting and receiving information. The recited function does not recite receiving information, so a receiver is not necessary for performing the claimed function and thus any construction that would include a receiver would include structure not necessary to perform the recited function.

B.   '924 Patent Claim Terms

I have been asked by counsel to provide opinions regarding the following disputed claim term of the '924 Patent.

> **1.   "a computer within the housing . . . wherein the computer is adapted to perform a control function of the handheld device based on at least one of the first camera output and the second camera output"**

GTP: No construction necessary.

Samsung/Huawei: the handheld device based on at least one of the first camera output and the second camera output" The dependent claims currently asserted by Plaintiff add additional functions, including:

(1) "determine a gesture based on at least one of the first camera output and the second camera output" (Claim 6); (2) "determine a facial expression based on at least one of the first camera output and the second camera output" (Claim 7); (3) "determine at least one of the position and the orientation of the object based on the second camera output" (Claim 8);

59.   I understand that there is a presumption that if a claim term does not recite the word "means" it is not a means-plus-function limitation, and its construction is not governed by 35 U.S.C. § 112, ¶6. This term does not recite the word "means," so I understand that there is a presumption that it is not a means-plus-function limitation. I understand that that presumption can be overcome if the limitation fails to recite sufficiently different structure.

60.   Claim 1 recites a "handheld device" comprising several elements. First, the "handheld device" recites "a housing." Second, it recites "a computer within the housing." Then it recites first and second cameras. The term "a computer" recites sufficient structure to a person of ordinary skill in the art. The term "a computer within the housing" also recites sufficient structure. It would inform a person of ordinary skill in the art that "a computer," which is a well-understood term, is located within the claimed housing of the "handheld device."

C.   '949 Patent Claim Terms

61.   I have been asked by counsel to provide opinions regarding the following disputed claim terms of the '949 Patent.

> 1.   **"a processing unit within the device housing and operatively coupled to an output of the electro-optical sensor, wherein the processing unit is adapted to: determine a gesture has been performed in the electro-optical sensor output, and control the digital camera in response to the gesture performed in the electro-optical sensor field of view, wherein the gesture corresponds to an image capture command, and wherein the image capture command causes the digital camera to store an image to memory"**

GTP: No construction necessary.

Samsung/Huawei: Means-plus-function Function: "determine a gesture has been performed in the electro-optical sensor output, and control the digital camera in response to the gesture performed in the electro-optical sensor field of view, wherein the gesture corresponds to an image capture command, and wherein the image capture command causes the digital camera to store an image to memory" The dependent claims currently asserted by Plaintiff further add to the function, including: (1) determining a gesture that includes a hand motion (Claim 2) Structure: Indefinite

62.   This term does not recite the word "means," so I understand that there is a presumption that it is not a means-plus-function limitation. I understand that that presumption can be overcome if the limitation fails to recite sufficiently different structure.

63.   Claim 1 recites a "portable device" comprising "a device housing" with portions and sensors. It also recites "a processing unit within the device housing and operatively coupled to an output of the electro-optical sensor." A person of ordinary skill in the art would understand that both limitations describe the physical relationship and connections between the recited components of the claimed "portable device." The term "a processing unit" recites sufficient structure to a person of ordinary skill in the art. A person of ordinary skill in the art would understand that "a processing unit" is a microprocessor, computer, or central processing unit.

64.   This claim term would inform a person of ordinary skill in the art that the claimed "a processing unit" is physically located within the device housing and is operatively coupled to an output of the electro-optical sensor. The claimed processing unit is also not being functionally claimed in my opinion. Rather, the claim stated that "wherein the processing unit is adapted to: (1) "determine a gesture has been performed in the electro-optical sensor field of view based on the electro-optical sensor output and (2) control the digital camera in response to the gesture

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performed in the electro-optical sensor field of view, wherein the gesture corresponds to an image capture command, and wherein the image capture command causes the digital camera to store an image to memory." This language is not functional but structural. The particular processing unit must be capable of being programmed to have the capabilities recited in the claims.

2. "processing unit"

GTP: No construction necessary.

Samsung/Huawei: Function: "determining a gesture has been performed in the electro-optical sensor field of view based on the electro-optical sensor output, wherein the determined gesture corresponds to an image capture command" The dependent claims currently asserted by Plaintiff further add to the function, including: (1) determining a gesture that includes a hand motion (Claim 9) Structure: Indefinite

65.   This term does not recite the word "means," so I understand that there is a presumption that it is not a means-plus-function limitation. I understand that that presumption can be overcome if the limitation fails to recite sufficiently different structure.

66.   Claim 8 is a computer implemented method. Similar to the previous term, the first step of the method recites providing a portable device with portions and sensors. It also recites a determining step, "using a processing unit." A person of ordinary skill in the art would understand that both limitations describe the physical relationship and connections between the recited components of the claimed "portable device." The term "a processing unit" recites sufficient structure to a person of ordinary skill in the art. A person of ordinary skill in the art would understand that "a processing unit" is a microprocessor, computer, or central processing unit.

67.   This claim term would inform a person of ordinary skill in the art that the claimed "processing unit" makes a determination based on the "electro-optical sensor output." This language is not functional but structural. The particular processing unit must be capable of receiving the "electro-optical sensor output" and making a determination.

> **3.** **"processing unit operatively coupled to the sensor and to thedigital camera, wherein the processing unit is adapted to: detect a gesture has been performed in the electro-optical sensor field of view based on an output of the electro-opticalsensor, and correlate the gesture detected by the sensor withan image capture function and subsequently capture animage using the digital camera, wherein the detected gestureis identified by the processing unit apart from a plurality ofgestures"**

GTP: No construction necessary.

Samsung/Huawei: Function: "detect a gesture has been performed in the electro-optical sensor field of view based on an output of the electro-optical sensor, and correlate the gesture detected by the sensor with an image capture function and subsequently capture an image using the digital camera, wherein the detected gesture is identified by the processing unit apart from a plurality of gestures" The dependent claims currently asserted by Plaintiff further add to the function, including: (1) determining a gesture that includes a hand motion (Claim 14) Structure: Indefinite

68.   This term does not recite the word "means," so I understand that there is a presumption that it is not a means-plus-function limitation. I understand that that presumption can be overcome if the limitation fails to recite sufficiently different structure.

69.   Claim 13 recites an "image capture device" comprising a "device housing" with portions and sensors. It also recites "a processing unit operatively coupled to the sensor and to the digital camera." A person of ordinary skill in the art would understand that both limitations describe the physical relationship and connections between the recited components of the claimed "image capture device." The term "a processing unit" recites sufficient structure to a person of ordinary skill in the art. A person of ordinary skill in the art would understand that "a processing unit" is a microprocessor, computer, or central processing unit.

70.   This claim term would inform a person of ordinary skill in the art that the claimed "a processing unit" is operatively coupled to the sensor and to the digital camera. The claimed

processing unit is also not being functionally claimed in my opinion. Rather, the claim stated that "wherein the processing unit is adapted to: (1) detect a gesture has been performed in the electro-optical sensor field of view based on an output of the electro-optical sensor and (2) correlate the gesture detected by the sensor with an image capture function and subsequently capture an image using the digital camera, wherein the detected gesture is identified by the processing unit apart from a plurality of gestures. This language is not functional but structural. The particular processing unit must be capable of being programmed to have the capabilities recited in the claims.

> **4.   "the electro-optical sensor" / "the electro-optical sensor field of view"**

GTP: No construction necessary.

Samsung/Huawei: Indefinite for lack of antecedent basis

71.   I have reviewed claim 13 of the '949 Patent. In relevant portion, claim 13 reads: "a device housing including a forward facing portion, the forwarding facing portion encompassing a digital camera adapted to capture an image and having a field of view and encompassing a sensor adapted to detect a gesture in the digital camera field of view; . . . detect a gesture has been performed in the electro-optical sensor field of view based on an output of the electro-optical sensor." See '949 Patent at 16:24-34.

13. An image capture device comprising:

a device housing including a forward facing portion, the forwarding facing portion encompassing a digital camera adapted to capture an image and having a field of view and encompassing a sensor adapted to detect a gesture in the digital camera field of view; and

a processing unit operatively coupled to the sensor and to the digital camera, wherein the processing unit is adapted to:

detect a gesture has been performed in the electro-optical sensor field of view based on an output of the electro-optical sensor, and

correlate the gesture detected by the sensor with an image capture function and subsequently capture an image using the digital camera, wherein the detected gesture is identified by the processing unit apart from a plurality of gestures.

See '949 Patent at 16:23-39.

72.   I understand that Defendants claim this term is indefinite for lack of antecedent basis. I disagree. One of ordinary skill in the art would understand that the reference to "the electro-optical sensor" in the context of the processing unit element refers to "a sensor adapted to detect a gesture" described earlier in the claim. This can easily be seen by an examination of the claim language. The first element of the claim is for a "device housing" that includes a digital camera and "a sensor adapted to detect a gesture in the digital camera field of view. A person of ordinary skill in the art would understand that a "sensor" "in the digital camera field of view" is an electro-optical sensor because it converts an optical signal (i.e., light) to an electrical signal. Then the claim recites "detect[ing] a gesture has been performed" by "the electro-optical sensor." Based on this, it is my opinion that "the electro-optical sensor" is referring to "a sensor" from earlier in claim 13. Thus, it is my opinion that the scope of claim 13 would have been reasonably ascertainable to a person of ordinary skill in the art and is therefore not indefinite.

5.   "the detected gesture is identified by the processing unit apart from a plurality of gestures"

GTP: No construction necessary.

Samsung/Huawei: Indefinite, including for lack of antecedent basis

73.   I have reviewed claim 13 of the '949 Patent. In relevant portion, claim 13 reads:

"correlate <u>the gesture detected by the sensor</u> with an image capture function and subsequently

capture an image using the digital camera, wherein <u>the detected gesture is identified by the</u>

<u>processing unit apart from a plurality of gestures</u>." *See* '949 Patent at 16:36-39.

> 13. An image capture device comprising:
> a device housing including a forward facing portion, the
>   forwarding facing portion encompassing a digital cam-
>   era adapted to capture an image and having a field of
>   view and encompassing a sensor adapted to detect a
>   gesture in the digital camera field of view; and
> a processing unit operatively coupled to the sensor and to
>   the digital camera, wherein the processing unit is
>   adapted to:
>   detect a gesture has been performed in the electro-opti-
>   cal sensor field of view based on an output of the
>   electro-optical sensor, and
>   correlate the gesture detected by the sensor with an
>   image capture function and subsequently capture an
>   image using the digital camera, wherein the detected
>   gesture is identified by the processing unit apart from
>   a plurality of gestures.

See '949 Patent at 16:23-39.

74.   I understand that Defendants claim this term is indefinite for lack of antecedent

basis. I disagree. One of ordinary skill in the art would understand that the "the detected gesture"

and "the gesture detected by the sensor" refer to "a gesture" that is detected one sub-element

earlier: "detect a gesture." There is nothing unclear about this claim language and one of skill in

the art would easily understand the scope of the claim. It is my opinion that the scope of claim 13

would have been reasonably ascertainable to a person of ordinary skill in the art and is therefore

not indefinite. To the extent, Defendants are arguing that this claim term is indefinite for the

reasons given for "the electro-optical sensor terms," I incorporate here my discussion of those

terms and the reasons and bases for why they are not indefinite.

D.   '079 Patent Claim Terms

75.   I have been asked by counsel to provide opinions regarding the following disputed claim term.

1.   "a processor adapted to determine the gesture performed in the work volume and illuminated by the light source based on the camera output"

GTP: No construction necessary.

Samsung/Huawei: Function: "determine the gesture performed in the work volume and illuminated by the light source based on the camera output" The dependent claims currently asserted by Plaintiff further add to the function, including: (1) determining a pointing gesture (Claim 19) Structure: Indefinite

76.   This term does not recite the word "means," so I understand that there is a presumption that it is not a means-plus-function limitation. I understand that that presumption can be overcome if the limitation fails to recite sufficiently different structure.

77.   Claim 11 recites a "computer apparatus." The claim recites three components of the "computer apparatus:" (1) a light source, (2) a camera, and (3) a processor. The term "a processor" recites sufficient structure to a person of ordinary skill in the art. A person of ordinary skill in the art would understand that "a processor" is a microprocessor, computer, or central processing unit.

78.   This claim term would inform a person of ordinary skill in the art that the claimed "a processor" is operatively coupled to the sensor and to the digital camera. The claimed processor is also not being functionally claimed in my opinion. Rather, the claim stated that the processor is adapted to determine the gesture performed in the work volume and illuminated by the light source based on the camera output. This language is not functional but structural. The particular processing unit must be capable of being programmed to have the capabilities recited in the claims.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct. Executed on July 16, 2021 .

Dated: July 16, 2021

Benedict Occhiogrosso

EXHIBIT A

DVI Communications, Inc.
11 Park Place
New York, New York 10007
212.267.2929
212.267.2954 Fax
http://www.dvicomm.com

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Curriculum Vitae

Professional Summary

Mr. Occhiogrosso is recognized in the field of Telecommunications and Information Technology. His expertise encompasses a broad range of technical and managerial disciplines including voice communications, data networking, carrier services for public/private switched & dedicated networks, image processing, wireless and cable transmission systems, security systems including intruder detection, access control and video surveillance as well as operational and strategic planning. As co-founder and President of DVI Communications, Inc. he is responsible for overseeing corporate operations and providing executive level direction on strategically significant projects. During the course of his career, he has worked for various organizations in a consultative, design/engineering and managerial capacity. He has supported numerous clients with respect to technology consulting in the financial services, high technology, legal, corporate, health care and education sectors. His technical practice presently encompasses Strategic Planning and Expert Witness litigation support. Earlier in his career, he worked in the military aerospace industry developing strategic and tactical command and control systems for various agencies in the defense and intelligence communities.

Expertise

- Automated out dialing systems
- Access control systems
- Automatic Call Distribution (ACD) & Interactive Voice Response (IVR)
- Cabling & Wire-based systems
- Cellular telephony
- Intrusion detection systems
- LOS Microwave Systems
- Mission - Critical Infrastructure Design for Data Centers
- Mobility management
- Packet Radio

- Packet Switching /Internet Protocol
- Packet Speech / Voice over IP
- Satellite communications
- Telephone switching systems
- Video Surveillance Systems & video Digitization
- Voice digitization/voice processing
- Voice messaging
- Wireless Communications Systems

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Education

Year	College or University	Degree
1975	Polytechnic Institute of Brooklyn	MS, Electrical Engineering
1975	Polytechnic Institute of Brooklyn	BS, Electrical Engineering

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Enterprise Consulting Engagements

Mr. Occhiogrosso has been affiliated with DVI Communications since 1979, below are significant consulting engagements for which he has served as Principal-in-Charge and/or Project Manager.

- ***Bertelsmann - New York, NY*** (1992- 1994)
  Mr. Occhiogrosso led the DVI team that provided planning, design, procurement and implementation management services associated with the "fast-track" relocation of 2,400 employees and 6 corporate subsidiaries into a new 900,000-sq. ft. office tower. A Northern Meridian telephone switch supporting 3,000 users, Satellite antenna farm, high speed LAN and Cat 5 cabling plant was deployed. Our services covered voice/data communications and video network infrastructure, data center design and rooftop satellite communications.

- ***Bear Stearns & Co., New York, NY*** (1999-2002)
  Mr. Occhiogrosso served as DVI's Principal-in- charge and Lead designer supporting the design, engineering acquisition and implementation management of a 1500 position trading floor and an 8,000 plus Centrex replacement for Bear Stearns' new world headquarters. The floor employed dual handsets, digital recording, VOIP, global hoot n' holler and traditional intercom with CTI hookups to application processors. IPC IQMX (IP turrets) with a Racal Tienna (all-digital, disk based/recording systems were deployed.

  DVI had provided the project management and voice technologies consulting for the design, engineering and acquisition of all Back Office Voice, and Trader Voice, Communications Systems for BSC's new headquarters. This included: 8,000+ lines metro area switching system, a 5000+ user unified messaging system, as well as conferencing, intercom, paging and wireless systems. Systems examined included leading edge technologies from Lucent and Nortel as well as Verizon's Centrex offering. A massive research effort was mobilized in order to specify the major telecommunications systems to be purchased for the new headquarters building at 383 Madison Avenue. As part of developing the new Voice Technology for Bear Stearns HQ, DVI also contributed to the installation of a Demonstration and Test lab at Bear Stearns. DVI coordinated support from IPC, Bell, Lucent and Nortel. DVI furthermore managed the implementation and installation of two PBX's, Nortel 81C and a Nortel Meridian1 (Option 11c), IPC Tradenet MX Alliance system and Octel and Call Pilot voicemail, as well as the installation of a QSIG interface between IPC, Lucent, and Nortel. The installation consisted of managing the scope of the project, as well as supervising the various Trades (electricians, IPC, cabling) for the installation of PBX's, Trunks, Lines (T1, E1 and PRI's), phone sets, voicemail, and supervising and coordinating the demonstration of voice products for BSC's management and IT personnel. DVI also contributed to the

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Installation of two Unified Messaging solutions, Octel and Call Pilot. Octel was installed as a separate system, isolated from the BSC environment. The Nortel Unified Messaging was installed and rolled out to test users in the BSC environment.

- ***City University of New York, College of Staten Island*** (1990-1997)
  Mr. Occhiogrosso served as project executive where DVI provided systems engineering, design, and procurement and implementation services in conjunction with the development of the College's new 19 building Willowbrook campus. This encompassed all voice, data, and video communications systems, inter/intra-building cabling, and radio and telemetry systems for the campus. The systems deployed support over 12,000 students and essential operations including administrative and academic computing, registration, finance, departmental, library, media/educational center, building and grounds. The systems designed and acquired included cabling, fiber backbone, LANs, telephone switch and data communications servers. Three (3) AT&T Definity G3s with Audix supporting over 2,000 extensions were deployed. DVI was also responsible for developing a technology implementation and transition plan for the relocation and consolidation of the College's previous campuses to the new campus.

- ***Brooklyn Union Gas*** (1989- 1992)
  Mr. Occhiogrosso oversaw the analysis, design and engineering, selection for all voice (PABX/ACD/VRU), cabling and data communications for the new headquarters complex at Metrotech. This encompassed BUG's general office as well as the command-control System Control Complex which employed specialized LAN, video and process control telemetry data. An AT&T Definity G3i System supporting Audix voice mail and ACD were deployed. The Melita automated outdialler for credit collection was also deployed.

- ***Société Genérale - New York, NY*** (1993-1995)
  In conjunction with the relocation of the Bank's U.S. headquarters to a new 350,000-sq. ft. office, DVI provided a full suite of telecommunications consulting services. The project involved the needs assessment, design, selection and implementation of technology for the bank's 300+ position trading floor (Etrali turrets/Triarch ITP), data networks (LAN/WAN), voice communications (PABX, voice mail), market data services and premises cabling infrastructure.

- ***Roswell Park Cancer Institute – Buffalo, NY*** (1992-1997)
  Mr. Occhiogrosso as project director, provided project planning, design, engineering, and procurement and implementation management services in support of the modernization of this nationally recognized cancer care center. The complex, consisting of an 18 building campus, underwent a $241MM modernization, which included a state-of-the-art telecommunications network interconnecting the complex with a new telephone/voice mail system (NTI), in-building wireless telephony and high-speed local area networking. These systems where designed to support a new 180 bed hospital, new lab/vivarium complex, several renovated buildings, bed side computing and high resolution medical imaging transmissions.

- ***Citibank - New York, NY*** (1979- 2000)
  Mr. Occhiogrosso served as project manager, project principal and lead investigator for DVI's efforts in support of Citicorp. DVI designed and procured a multi-node N.Y. City wide voice

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communications system supporting over 20,000 lines (Citipax). This distributed system replaced several large existing PBXs as well as Centrex service based upon digital central office technology. Three NTI SL-100s were deployed to serve five locations. This included the tower at Court Square, LIC (1.1 MM sq. ft.). This system was expanded to include an 8000-user voice Messaging system (VMS). DVI supported feasibility, economic and requirements analyses as well as the design, engineering and implementation support for Citipax. DVI also performed a detailed disaster recovery plan/vulnerability analysis.

In addition to the Citipax PABX system, Mr. Occhiogrosso had also supported numerous diverse projects for Citicorp, including:

– Analyzed and improved the performance of a large-scale international message switching system (Citiswitch II), which supports numerous EFT applications. He subsequently participated in a task force to redesign Citibank's international message switching network.

– Specified and supported the design of an international packet switching network (CitiWIN) that integrated numerous Citibank applications and is deployed in some ninety (90) countries.

– For the domestic banking group, supported the analysis and design of home services offering advanced banking and investment services to customers in the privacy of their homes.

– For NYBOPS, analyzed alternate disaster recovery strategies for a multi-site ACD, including the Rockwell System and Periphonics VRU.

– For CitiSatcom, supported the complete procurement cycle for Citibank's VSET network deployment.

– He also supported several new business ventures including: DTS (Digital Transmission Services), FM subcarrier information service distribution and Videotex.

– He also provided ongoing technological consultation to Citibank in the areas of protocol conversion, digital PABX's and Local Area Networks.

Mr. Occhiogrosso has continued to support several consulting clients. A summary of consulting projects as follows:

For *Capital One Financial* (2004-2005*)*, Glen Allen VA a Credit Card Processing concern, he performed analysis and design of replacement VoIP technology for Cap One's existing voice communications systems in its HQ, front and back offices and call/ contact centers at multiple corporate campuses. This included PBX, voice mail, ACD and examined both premises-based systems as well as managed service alternatives.

For *Medical & Health Research Associates (MHRA)* (2005-2007), NY, he designed and selected the PBX, Voice mail, Access control, Video Surveillance and Telecommunications Services which support their new HQ operations.

For *Montclair State University* (2006-2008), Montclair NJ as part of their Campus IT Infrastructure Upgrade, he performed a critical design review of the new Fiber Optic Backbone Cabling and Transmission Systems

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For the *NYC School Construction Authority (*2005-2007), to Enhance Physical security at dozens of Elementary & intermediate Public Schools in NYC, he headed up a Quality Assurance team which evaluated the Digital Video over IP Surveillance systems installed. The system employed analog cameras, video codecs, LAN distribution and video compression, motion detection and image processing.

For *SES Americom* (2005 –2009), Princeton NJ**,** he provided consulting services for Telecommunications Systems upgrades and New Service Introduction.
This included: VoIP System design and deployment for the Maritime Mobile Broadband service, Encrypted IPTV, and a future Ka-band Satellite Communications system.

For the *Port Authority of NY & NJ* (2007), he provided consulting services for Strategic Plan for VoIP Migration & Financial Analysis of both premise-based and managed services to support 12,000+ users.

For the *NYC Transit Authority, MTA* (2007-2015), he is the Principal –in –charge of a major project to replace and upgrade the Radio System which presently serves 5000 buses, 1000 support vehicles and hundreds of portable users throughout NYC, the edge of NJ and parts of Westchester. The system operates at 800 MHz will use Digital TDMA Radios and will also deploy over 2 dozen new base stations(with wired and microwave backhaul) as well as a state-of-the-art Command & Dispatch center (manned 7/24) with full security and back-up. All buses will support 2-way communications, Automatic Vehicle Location and Tracking and emergency Notification system.

For *Governors Island* (2008 -2011), he developed the Island-wide Telecommunications, IT and Security infrastructure which encompasses 2-way digital radio, telephone and data switching, fiber optic and copper cabling plant, video surveillance and perimeter security system, master security console, Audio – visual subsystems and wireless backhaul to support Island operations as well as that of future prospective tenants.

Research & Development

For DARPA (1976-1979), Mr. Occhiogrosso supported research into packetized voice communications and integrated packet –circuit switching systems of voice, data and wideband applications. He also supported the analysis and design of low-bit rate vocoders with cryptosystems in shared user networks (mixed satellite and terrestrial) for survivable communications (pre-post and trans-attack).

Among the other Military C3I systems he worked on included:

- Marine Integrated Fire and Air Support System (MIFASS) for Navalex and USMC (1979-1982)
- Landing Force Integrated Communications System (LFICS) for Navalex and USMC (1981-82)
- Position Location Reporting System (PLRS) for USA/USMC (1980-82)
- Digital Communications Terminal (DCT) for USA(1982)
- AUTODIN II (for Defense Communications Agency (DCA) (1976-78)
- SORAK (for USAF, on behalf of Republic of South Korea) (1982)
- ULCS/ULMS (Unit Level Circuit and Message Switches) for Tri-Tac (1976-1978)
- JTIDS (Joint Tactical Information Distribution System) for USAF (1977)
- Integrated Local Regional Access Network (ILRAN) for DCA (1976-7)
- Several classified initiatives (1975-79)

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For DVI Communications internally and under development to TIE/Communications (1982-1986), Mr. Occhiogrosso led an engineering development team which developed a Store-and-Forward voice messaging system, the Speech Message Switch (SMS) for integrated use with TIE's voice-data PABX and standalone use for general industry. Product development encompassed hardware, component selection, circuit design, PC layout fabrication and testing, as well as software: specification, coding, debug and test.

 For Xerox Corporation (1977-79), Mr. Occhiogrosso served as the Program Manager for a major support effort to develop a distributed satellite and microwave-based nationwide network (XTEN), providing advanced communications features to the business community, including: electronic document distribution, high speed data communications, communications security, and video teleconferencing. He was responsible for technical activities in the areas of system architecture and design, communications protocol development and implementation, security architecture, system service specifications, and simulation model development for traffic loading and performance evaluation.

Wireless Experience

He has also supported numerous radio communications/wireless systems technologies including: Satellite (C- and Ku-band), LOS Microwave (4-40 GHz), UHF/VHF (AM/FM/TV Broadcast), Cellular (800 MHz), PCS (1.9GHz), paging (150/400/900 MHz) as well as in-building wireless 802.11 a/b/g. He is also thoroughly familiar with transmission characteristics of various channels and the tradeoffs in power management, modulation and encoding schema and reception techniques. Among the engagements he have supported spanning these technologies include:

- Design and implementation management of C and Ku-band satellite networks using TDMA & FDMA access methods for the United Nations and Citigroup (1988-1995)
- Rooftop Satellite Systems Deployment for Data and TVRO applications for BMG and various Financial Services Firms (1991)
- Design and Implementation Management of Digital Page/ Radio –based Alerting System for Con-Edison and Power Authority of the State of NY (Indian Point); this included Radio frequency selection and radio control system design, based on frequency allocations, availability of base station and repeater, and path profile calculations.(1979-1982)
- Design and Implementation of 2-way digital TDMA Land Mobile Radio system (GPS-capable) for Governors Island NYC (2010)
- Design and Implementation management of Satellite Antenna Farm and LOS Microwave Back-up Links for Major Newspaper Worldwide Publishing Network (2005-2006)
- Expert Witness support in VSAT Ku- band deployment litigation (1993-95)
- Expert Witness support in Breach of Contract suit for Air-to-Ground in-Flight Communications Systems(1994 – 1998)
- Rooftop Site Management, Survey and Upgrade Plans for Metropolitan Life Real Estate (multiple Properties) (1992-95)
- Numerous In-building Wireless Systems deployments using Wi-Fi 802.11a/b/g technology (university, corporate and Health care applications) including coverage /capacity analysis, security , hardening and integration with existing LAN infrastructure (2005-2015)
- Analysis of use of cellular data communications systems for Back-up and Recovery links to traditional wire line facilities (1985-89)

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- Design and Implementation Management of LOS Microwave and Point-to-point Infrared High Speed Communications Links for various corporate, institutional and Government applications (2000-15)

Litigation Support Experience

Mr. Occhiogrosso served as an expert witness in various cases for several high-tech corporations encompassing patent infringement, trade secrets, product malfunctions Class Action for Service Level Agreements and breach of contract. Detailed technical subject matter encompassed the following disciplines:

- Voice digitization/voice processing
- Voice over Internet Protocol (VoIP)
- Voice Mail and Electronic messaging
- Automatic Call Distribution (ACD) & Interactive Voice Response (IVR) Systems
- Cellular telephony and data communications
- Air-to-ground communications (S/L Band)
- Satellite communications (C and Ku Band)
- Telephone switching systems
- Predictive/ progressive dialing systems

A summary of major cases he has supported as either a testifying or consulting expert witness follows:

Type of Matter:	Class Action Lawsuit regarding CO-based System Performance of Voice Mail services
Client Law Firm:	**Stewart and Irwin P.C. - for Class** (Marion County Circuit Court, Indiana)
Case Name:	Class v. Ameritech
Services Provided:	Reviewed and analyzed extensive amount of documentation; provided **consultative expert assistance and deposition testimony**
Disposition:	Case was settled favorably for our side (the class)
Date:	2003-2004

Type of Matter:	Patent Infringement (IDDD Blocking for Public Pay Telephones)
Client Law Firm:	**Baker Botts LLP (Houston TX) - for SWBT**
Case Name:	Gammino v. SWBT (US District Court for the Northern District of Texas, Dallas)
Services Provided:	Patent infringement & Invalidity Analyses, rendered **Expert Reports** and **provided deposition Testimony & Court Testimony at a Markman Hearing** for Payphone Blocking patents (Instrument and CO based)
Disposition:	Case was decided in favor of our client SBC Communications/ SWBT; and upheld on appeal
Date:	2006-2007

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Type of Matter:	Patent Infringement (VoIP Telephony and Wireless)
Client Law Firm:	**Steptoe & Johnson LLP (Washington DC) - for Vonage**
Case Name:	Vonage v. Verizon (US District Court for the Eastern District of Virginia, Alexandria)
Services Provided:	VoIP Patent infringement, Enablement & Invalidity Analyses, **rendered Expert Reports, was deposed & provided Expert Testimony at Trial** for VoIP/ Wireless patents
Disposition:	Of the 3 patents in a 7 patent portfolio (that we handled) which Verizon alleged Vonage infringed, we assisted S&J In getting 2 patent infringement allegations withdrawn; Infringement Verdict against Vonage was overturned on Appeal for a third Wireless patent. Case subsequently settled.
Date:	2006-2007

Type of Matter:	Recapture of PE & O Insurance payout for IVR System Patent License
Client Law Firm:	**D'Amato Lynch (NYC) - for AIG**
Case Name:	AIG Specialty Lines v. American Century (US District Court for the Southern District of New York, New York City)
Services Provided:	**provided Expert consulting services** with respect to Computer telephony integration, IVR Systems Development and call center technology
Disposition:	Client sued and recovered Policy benefit payout from IVR developer
Date:	2004-2007

Type of Matter:	Patent Infringement (Cellular Telephony)
Client Law Firm:	**Hogan Hartson LLP (Los Angeles) –** for Kyocera Wireless Corp.(KWC)
Case Name:	MLR v. KWC (US District Court for the Southern District of California, San Diego)
Services Provided:	On behalf of a Telecommunications Electronics Manufacturer in Wireless and Cellular Telephony & Data communications, **performed Patent Infringement, & Invalidity Analyses on a 5 patent portfolio**
Disposition:	Case was settled favorably for our side (KWC)
Date:	2006-2007

Type of Matter:	Class Action Lawsuit regarding Junk Digital Fax (TCPA 1991 & JFPA 2005)
Client Law Firm:	**Phillips Murrah P.C. -** for AAF&R (Oklahoma City, OK)
Case Name:	Class v. All American Fitness & Racquetball Centers Inc. (AAF&R) (Oklahoma County Circuit Court, OKC)
Services Provided:	Reviewed and analyzed extensive amount of documentation; provided **consultative expert assistance and expert report**
Disposition:	Case was settled
Date:	2008

Type of Matter:	Patent Infringement (Specialty Communications Cabling & Wire)
Client Law Firm:	**LaRiviere, Grubman & Payne, LLP** (Monterey CA) for Monster Cable
Case Name:	Audiovox Corp. v Monster Cable Products Inc. & Counterclaim (US District Court for the Eastern District of New York)
Services Provided:	Reviewed and analyzed extensive amount of documentation; provided **consultative expert assistance and expert report**
Disposition:	Case was settled
Date:	2008

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Type of Matter: Patent Infringement (VoIP & Mobile Telephony)
Client Law Firm: **Ropes & Gray LLC**(New York) for Rebtel
Case Name: Stanacard, LLC v Rebtel Networks, AB & Rebtel Mobile, Inc. (US District
                       Court for the Southern District of New York, New York City)
Services Provided: Reviewed and analyzed extensive amount of documentation; provided
                       consultative expert assistance and expert report
Disposition: Case was settled favorably for our side
Date: 2008-2010

Type of Matter: Copyright Infringement re: Digital Ringtones for Mobile Telephony
Client Law Firm: **Lovells LLC** (New York) for ASCAP
Case Name: United States of America v ASCAP (US District Court for the Southern District
                       of New York, New York City)
Services Provided: Reviewed and analyzed extensive amount of documentation; provided
                       consultative expert assistance
Disposition: Case resolved
Date: 2009-2010

Type of Matter: IP Indemnification to Recapture of Payments for RAKTL Patent Portfolio
                       License(s)
Client Law Firm: **Bryan Cave (Atlanta,GA) - for AFLAC**
Case Name: American Family Life Assurance Company of Columbus v Intervoice, Inc. (US
                       District Court for the Middle District of Georgia, Macon Division)
Services Provided: Provided Expert consulting services with respect to IVR Systems Deployment,
                       Computer telephony integration, and call center technology; performed
                       infringement Analyses for IVR applications patents, **rendered Expert
                       Reports & was deposed.**
Disposition: Case was resolved in Intervoice's favor and decision was subsequently upheld
                       on appeal based upon intellectual property infringement indemnification clauses
                       in Purchase Agreement between the parties.
Date: 2010-2014

Type of Matter: Patent Infringement re: Call blocking for cellular telephony
Client Law Firm: **K&L Gates LLC (Boston MA), representing Sprint**
Case Name: Gammino v. Sprint Communications Co., Sprint Spectrum L.P., Nextel
                       Operations, Inc. & Virgin Mobile USA L.P. (US District Court for the Eastern
                       District of Pennsylvania)
Services Provided: Reviewed and analyzed extensive amount of documentation; provided
                       consultative expert assistance ; provided tutorial to court on cellular technology;
                       testified at Markman hearing
Disposition: Case was resolved in Sprint's favor for Non- infringement and this was upheld
                       on appeal.
Date: 2011 – 2013

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Type of Matter:	Patent Infringement re: Captioned Telephony
Client Law Firm:	**Baker Botts LLP (Austin TX), Akin Gump (NY NY)** and **Maschoff - Brennan** all representing Caption Call LLC and Sorenson Communications
Case Name:	*Ultratec, Inc. v. Sorenson Communications*, U.S. District Court for the Western District of Wisconsin, Case No. 3:13-cv-00346
Related Proceedings:	Petition for *Inter Partes* Review denied by Patent Trial and Appeals Board in the following proceedings: IPR2013-00540 through 00545, as well as 00549, 00550, IPR 2013-00288 and IPR2014-00780. IPR2015-00636,00637, IPR2015-01355 and 01357 through 01359, IPR2015-01886 and 01889, Petition for *Post Grant* Review denied by PTAB in PGR2016-00037
Services Provided:	Reviewed and analyzed 20 patents in suit (dozens of claims), numerous pieces of prior art; Rendered expert reports on Invalidity and Non – Infringement of Ultratec patents; Rendered expert reports on Validity and Infringement of Sorenson patents; Testified at trial; Deposed in both litigation and related IPR proceedings.
Disposition:	Re: CaptionCall patent – the PTAB determined the claims in the patent to be invalid and CaptionCall's infringement claims were withdrawn. Re: Ultratec's patents - Case was resolved initially in Ultratec's favor on Summary Judgement and for the remaining claims at trial with CaptionCall found to Infringe valid claims and Ultratec awarded damages. Subsequently nearly all claims in suit were found to be Invalid by the PTAB, and the case(s) have been stayed pending final resolution of the PTAB's decisions. The IPR decisions of the PTAB - finding in favor of CaptionCall are presently being appealed by Ultratec.
Date:	2013 – present

Type of Matter:	Patent Infringement re: Call Management and Softswitches
Client Law Firm:	**Cooley ,** representing Broadsoft
Case Name:	Broadsoft v Callwave (Case No. 1:13-cv-00711-RGA)
Services Provided:	Invalidity Analysis of asserted patents provided expert reports on invalidity, deposition and also declaration in summary judgement motion for invalidity on a subset of the claims. Technology involved caller ID spoofing, ANI and sequential and simultaneous ring protocols
Disposition:	Case is ongoing, summary judgement motion pending
Date:	2015- 2019

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Type of Matter: Patent Infringement re: Prison Telecommunications Systems
Client Law Firm: **Bragalone & Conroy,** representing Securus
Case Name: Securus Technology v Value – Added Communications
Services Provided: Invalidity Analysis of voice mail patents in prison resulting in a petition for IPR against the patent owner.
Disposition: IPR petition awaiting decision to institute, case was settled
Date: 2016- 2017

Type of Matter: Patent Infringement & Validity Analysis re: Digital Recording
Client Law Firm: **Fox Rothschild,** representing Verint
Case Name: Verint Systems v Red Box recorders (USD SNY 1:14-cv-05403-SAS)
Services Provided: Infringement Analysis of Defendant Technology (6 patents) and Validity Analysis of Plaintiff's patents (against 31 pieces of prior art), Expert reports, deposition and declaration in a motion for summary judgement in 101 Alice proceedings.
Disposition: Case was settled: defendant took out licenses for all asserted claims from Verint's IP licensing entity , the Open Innovation Network
Date: 2016-2017

Type of Matter: Patent Infringement & Invalidity Analysis re: VoIP Switching
Client Law Firm: **Fish Richardson,** representing Metaswitch
Case Name: Sonus Networks v Metaswitch Networks Ltd (C.A. NO2:18-CV-00057RWS).
Services Provided: Invalidity Analysis of Asserted patents, IPRs filed
Disposition: Case was settled
Date: 2018-2019

Type of Matter: Patent Infringement re: Call Center
Client Law Firm: **DLA Piper,** representing Call Miner
Case Name: NICE Ltd.et al. v. Cal/Miner, Inc. (C.A. No.18-02024-RGA (USDC D. Del.)
Services Provided: Invalidity Analysis of Asserted patents
Disposition: Ongoing , with IPRs filed
Date: 2019 -present

Type of Matter: TCPA Violation
Client Law Firm: **Bursor Fischer** representing Lorenzo Quintana et al
Case Name: Quintana et al v BB&T Co. Case No. 1:18-CV-00748-WO-JLW)
Services Provided: Expert Analysis of Predictive Dialer technology
Disposition: Ongoing
Date: 2019 -present

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Professional Affiliations, Achievements & Awards

- Institute of Electrical & Electronics Engineers (IEEE)
- Association for Computing Machinery (ACM) (former)
- Society of Telecommunications Consultants (STC) (former)
- Health and Information Management Systems Society (HIMSS) (former)
- Communications Managers Association (CMA) Consultant Partner (former)
- Electronic Industries Association (EIA) (former)
- Association of Old Crows (AOC) (former)
- Wall Street Technology Association (Author/Speaker)

Publications

Mr. Occhiogrosso was the sole, primary or contributing author to the following works encompassing a variety of technical subject matter which appeared in industry publications, technical journals, and chapters in technical text books or as a provisional application for a US patent.

Voice Mail, Digitized and Packetized Voice Systems

1. "Human Factors Considerations in the Design of Voice Mail Systems," Second International Symposium on Computer Message Systems. Washington D.C., September 1985.
2. "Voice Mail Technology Comes of Age Part I and II," Telephony, September 1984.
3. "Voice Store and Forward: A Rapidly Maturing Technology," Proceedings of ELECTRO '84. Boston, Massachusetts, May 1984
4. "Issues in Packet Voice Communication," Proceedings of IEEE, August 1979.
5. "Digitized Voice Comes of Age: Part II Techniques," Data Communications, April 1978.
6. "Digitized Voice Comes of Age: Part I Tradeoffs," Data Communications, March 1978.

Local Area Networks (LAN)

"LAN vs. PABX?" in Local Area and Multiple Access Networks. Computer Science Press, edited by R.L. Pickholtz, 1986.

Network Analysis & Design

1. "Analysis and Design of Hybrid Switching Networks," IEEE Transactions on Communications, September 1981.
2. "Packet Switched Voice and Data Networks Advantages and Costs," Telecommunications, December 1978.
3. "Economic Analysis of Integrated Voice and Data Networks: A Case Study," Proceedings of the IEEE, November 1978.

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4. "Design of Hybrid Switched Networks for Voice and Data," <u>Proceedings of the International Conference on Communications</u>, June 1978.

5. "Performance Analysis of Integrated Switching Communications Systems," <u>Proceedings of the National Telecommunications Conference</u>. Los Angeles, California, December 1977.

Data Center Design and Engineering
1. "Maximizing Uptime for Mission Critical Applications", <u>Development NY</u>, May 2004
2. "Data Center Design and hardening tips", <u>Development NY</u>, May 2005
3. "New Challenges in Data Center Design and Hardening", <u>Development NY</u>, May 2006
4. "An Economic Imperative: Reducing Data center Expenses", <u>Perspective NY</u>, October 2008*

Disaster Recovery
1. "Business Continuity and Disaster Recovery in an Age of Heightened Awareness", <u>Development NY,</u> April 2003
2. SOS: Selected Observations on Sandy … A Technology Perspective, <u>Perspective NY ,</u> Mission Critical Issue, 2013

In-Building Wireless
1. "The Ins and Outs of Building Wireless", <u>Development NY</u>, September 2004
2. "In-Building Technology: IP Convergence, Rise of Wireless & Building Emergency Communications", NYC Real Estate Expo , November 2010

Physical Security
1. "Safety and Security Retrospective: 5 Years after 9-11", <u>Development NY</u>, September 2006
2. "Growing Impact of Information Technology (on Security)", <u>Development NY</u>, November 2005
3. "IT Trends in Healthcare: The effect of EMRs on Hospitals", <u>Perspective NY</u>, Spring 2008

Internet of Things (IoT) Smart City/Smart Buildings/Energy/Transportation

1. "IoT Considerations, Requirements, and Architectures for Smart Buildings – Energy Optimization and Next Generation Building Management Systems", <u>IEEE IoT Journal, February 2017</u>
2. "Internet of Things (IoT)-based Apparatus And Method For Rail Crossing Alerting Of Static Or Dynamic Rail track Intrusions", <u>Proceedings of Joint Rail Conference (JRC), April 4-7, 2017, Philadelphia, PA</u>
3. "An Overview of IoT Technologies and Solutions for Smart Cities". Chapter in <u>Internet of Things, Editors: Q. Hassan, A. R. Khan, S. A. Madani, Wiley/IEEE Press,</u> to be published in 2018
4.   "The Emerging Energy Internet of Things", Chapter in <u>Internet of Things, Editors: Q. Hassan, A. R. Khan, S. A. Madani, Wiley/IEEE Press</u>, to be published 2018
5. "Distributed Sensor Systems: Mobile IPv6, Proxy MIPv6, and Related Protocols for Crowd-sensing Applications in Smart Cities Environments" (submitted to Conference & Expo on Emerging Technologies for a Smarter World (CEWIT2017))

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Internet of Things (IoT) E-health and Insurance

1. "Security Considerations for IoT Support of E-Health Applications", Chapter in Internet of Things, Editors: Q. Hassan, A. R. Khan, S. A. Madani, CRC Press, 2017, ISBN 9781498778510
2. "IoT Considerations, Requirements, and Architectures for Insurance Applications". Chapter in Internet of Things, Editors: Q. Hassan, A. R. Khan, S. A. Madani, CRC Press, 2017, ISBN 9781498778510.
3. "IoT Security (IoT Sec) Mechanisms For e-Health and Assisted Living Applications " (2nd IEEE/ACM International Workshop on Safe, Energy-Aware & Reliable Connected Health (SEARCH 2017))

Internet of Things (IoT) Security

1. "System and Method for a uniform measure and assessment of an institution's aggregate cyber security risk and of the institution's cybersecurity confidence index" (submitted as Non – Provisional Application 15/296,005 to the United States Patent & Trademark Office (USPTO), October 17,2016)
2. "IoT Security (IoT Sec) Considerations, Requirements and Architectures", 14th IEEE Annual Consumer Communications & Networking Conference (CCNC), January 2017, Las Vegas, NV

Emerging IoT Applications

1. "Issues in Multimedia IoT Systems and Applications", IEEE IoT TsC (Transactions on Service Computing), the IoT Forum and IPv6 Forum (collocated with the IoT Week), June 2017, Geneva, Switzerland.
2. "Energy – efficient IoT- based "Black Box" for Aeronautical and other applications (submitted to Consumer Communications & Networking Conference (CCNC), 2018 related to Vehicular Communications and Applications in Water, Land, and Sky)
3. "A Review of Wireless and Satellite-based M2M Services in Support of Smart Grids" 1st EAI International Conference on Smart Grid Assisted Internet of Things (SG IoT 2017) July, 2017, Sault Ste. Marie, Ontario, Canada